Amendment to the specification:

Please amend paragraphs [0002], [0018], [0022], [0052], [0057], [0061], [0062], [0065] and [0066] as shown below. No new matter has been added.

[0002] The present application is related to and concurrently filed with applications titled "A SYSTEM AND METHOD FOR ENHANCING THE ACCURACY OF A LOCATION ESTIMATE" [[SN #]] <u>10/531,044</u>, "WIRELESS COMMUNICATION NETWORK MEASUREMENT DATA COLLECTION USING INFRASTRUCTURE OVERLAY-BASED HANDSET LOCATION SYSTEMS" [[SN #]] <u>10/531,042</u>, "NETWORK OVERLAY LOCATION SYSTEM AND METHOD FOR AIR INTERFACE WITH FREQUENCY HOPPING" [[SN #]] <u>10/531,041</u>, "A SYSTEM AND METHOD FOR ESTIMATING THE MULTI-PATH DELAYS IN A SIGNAL USING A SPATIALLY BLIND ANTENNA ARRAY, [[SN#]] <u>10/531,039</u>, and "SYSTEM AND METHOD FOR OPERATING A NETWORK OVERLAY GEO-LOCATION SYSTEM WITH REPEATERS" [[SN #]] <u>10/531,038</u>, <u>each</u> filed October 16, 2003, the entirety of each of these applications is incorporated herein by reference.

[0018] Operators using smart antennas to change the size or orientation of sectors can shift the traffic load from an overtaxed sector to one or more underused sectors, thus in effect, routing network capacity where and when it is required. For example, a comparison can be made between Figure 2 where conventional sectors are illustrated and Figures 3a and 3b illustrating the controllable sectors enabled with the use of a smart antenna. In Figure 2 traffic loads across the three sectors <u>200</u> vary greatly, with a single sector 201 handling traffic for the office park 211 and most of the residential area 212. By contrast, the cell's sectors <u>300</u> in

Figures 3a and 3b have been resized and reoriented to the traffic load is more evenly distributed among the three sectors. Each sector's beam width has been altered to best accommodate the peak traffic load in that sector. In Figure 3a the narrow sector 301 covering the office park 211 maximizes capacity for a high traffic area, while the relatively wide sector 303 covering the water 214 provides adequate capacity for a low-traffic area. And as shown Figure 3b, the sectors can be redefined to provide narrow sector 303 coverage to the football stadium 215 when a large event is taking place.

[0022] For example, Figure 5a shows a communication system with 7 base stations and their associated overage areas 501. A base station 510 is designated to operate in a three-sector mode (A 511, B 512, and C 513). The infrastructure equipment (mobile switch, not shown) contains data that indicates what RF channels are mapped to what sectors at the base station 510. In the example shown channels u and v, w and x and y and z are mapped (assigned) to sectors A 511, B512 and C 513 respectively. Without a smart antenna operating, when a mobile 500 is provided service on a traffic channel, the sector serving the mobile would be known by the mobile switch (sector A 511) based on the assigned RF channel/traffic channel (channel v). The geo-location system would task sensors in the vicinity of the serving A sector area, namely sensors in sector 523 of base station 520, and sector ~~532~~ 533 of base station 530 to locate the mobile. Other sectors can also be tasked on their vicinity to the serving sector, however only the two closest are shown for clarity of illustration.

[0052] Figure 6 is an embodiment 600 of a wireless communication system with a network overlay geo-location system that accounts for the sector and channel variations presented by the use of a smart antenna in locating a target mobile appliance. As in Figure 1,

the host wireless communication system includes a plurality of base stations 601-604 and a mobile ~~switching~~ positioning center [[45]] (MPC) 605 (Figure 1). One of the base stations 601 in Figure 6 is shown with a smart antenna 610. The smart antenna 610 contains the same features with the same reference numerals as described previously in Figure 4. The network overlay geo-location system is formed by a central processing unit, GCS 650 and a plurality of sensors (621-624) located at the base stations.

[0057] The embodiment 700 shown in Figure 7 also includes another database or database fields which include time adjustments for sensors attached to smart antennas. In smart antennas the additional time delay elements in the RF path between the antenna array 401 and the location sensor (WLS) exist due to the processing in the pattern forming network. In this embodiment the sensors are located in the receive path after the pattern-forming network. These time adjustments are stored in the auxiliary database 641 and are sensor specific. The time delay adjustments can be empirically or experimentally determined. In this way, the time delay for these elements can be compensated for in the time difference of arrival calculation. The key can also trigger the execution of other function at the sensors as described below.

[0061] The geo-location system scans antenna elements of all the sectors in the serving sectors base station and may also scan antenna elements in neighboring base stations as shown in block 804. A parameter, such as received signal strength, or a quality metric formed from a cross correlation of known features of the target mobile signal, such as a training sequence pattern, pilot signal or other known data, is estimated or measured for each of the antennas scan in block 805. The geo-location system using the received signal strengths or other suitable signal parameter determines or selects the actual geographic sector serving the mobile

appliance as indicated in Block 806 and determines sector sensors (WLS) in the vicinity of the actual serving sector in block 807 which are tasked to determine the time of arrival of the mobile appliances signal in block 808. The geo-location system then locates the mobile appliances by the time-of-arrival at the selected sector sensors using time-difference-of-arrival or angle-of-arrival in blocks 809, 810. Since the actual sector is determined and used to identify sensors in the vicinity, the accuracy of the information provided by the MPC will not affect the accuracy of the determined location. The mobile appliance's signal is typically a traffic channel, however, reverse pilot signals available in 3rd Generation CDMA systems can also be used in the geo-location system.

[0062] Figure 9 is a representation of the process used to address the situation presented in Figure 5b. A smart antenna operating at base station 910 reassigns RF channel, z from sector C 913 to sector A 911 through an RF switch in the smart antenna to accommodate extra traffic seen on the A sector 911. The MPC relays mobile information to the geo-location system, including information designating sector C 913 as the serving sectors. The geo-location system accesses a database, or a field in the system configuration database indicating the serving sector C 913 is at a base station with a smart antenna. The geo-location system scans all the antenna elements of sectors 911, 912 and 913 and measures the received signal strength of the mobile signal. The measurements indicate the strongest signal from an antenna element located in the A sector 911 and thus tasks the sensors (WLS) in sectors proximate to the actual sector A 911, namely the sensor at sector 932 of base station 930 and sector 923 of base station 920 to record the time of arrival of the mobiles signal. Of course, as stated previously, other sensors in the vicinity of the actual sector can also be tasked to locate the mobile appliance, however are not

shown for clarity. The geo-location system then uses these times of arrival to calculate time difference of arrival, angle of arrival or other known means to locate the mobile appliance 900. The results of the described method, when compared with that shown in Figure 5B is clearly advantageous. The similarly advantageous sensor selection and geo-location would result if the operation was applied to the example demonstrated in Figure 5c.

[0065] Figure 12 is a flow chart of another embodiment of the disclosed subject manner. As shown in block 1201, the geo-location system tasks sensors at more than one base stations in the communication system to search for the mobiles signals. The tasked sensors measure received signal strength of the mobile signal, block 1202, and the geo-location system selects a set of the sensors in block 1203 to locate the mobile based on the measured received strength of the signal. In this manner, the actual sector of the mobile appliance is not needed. The sensors selected to locate the mobile are selected on the basis of their actual ability to receive the signal, therefore their vicinity is irrelevant. The geo-location system uses TDOA, and/or AOA of the signal at the selected sensors to locate the mobile in block 1204. Figure 13 shows a representation of the operation of the location system for Figure 12 in the scenario presented in Figure 5b.

[0066] As shown in Figure 13, each of the sectors 1323, 1332, 1342, 1351, 1361, 1373 searches for the signal. Sectors 1332, 1342, 1361 and 1373 received the signal at a sufficient high signal strength and thus are identified and participate in the determination of a location of the mobile 1300. Under other operations as shown in Figure 9, sector 1323 would normally also be selected, however, because of other factors such as geography, or antenna height or localized interferers, the signal was not received with a high signal strength. Nonetheless, the

geo-location system, since it does not rely on the sector information from the MPC, was able to locate the mobile 1300.